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ABSTRACT

Evidence suggests that instruction in thinking skills is neither widespread nor successful. Most students do not score well on tests that measure their ability to recognize assumptions, evaluate arguments, or appraise inferences. However, a number of educators believe that it is possible to teach thinking skills, and have suggested that the teaching of thinking skills may take two forms: the pervasive approach or the subject approach. Those who advocate the pervasive model contend that thinking skills should be taught in all subject areas, and that content and intellectual processes are mutually reinforcing. Others believe that thinking is best taught as a distinct subject, and have adopted such approaches as Edward de Bono's CoRT Thinking Program to develop such a subject area. Although teaching thinking as a discrete subject may remove it from daily, widespread exposure, de Bono argues that thinking will not receive enough focused attention, and generalizable, transferable skills will not be acquired if it is taught across the curriculum. Other researchers of thinking skills emphasize questioning techniques, such as varying levels of questions, waiting for student responses, asking how students arrived at their answer, and stressing comprehension. All agree that such skills are attainable if there is collective, institution-wide commitment to do so. (Four pages of notes are included.) (JC)

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INSTRUCTIONAL STRATEGIES FOR THE DEVELOPMENT OF THINKING SKILLS

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INSTRUCTIONAL STRATEGIES
FOR THE DEVELOPMENT OF THINKING SKILLS

In its 1979-80 report Reading, Thinking and Writing, the National Assessment of Educational Progress concluded: "The most significant finding from this assessment is that while students learn to read a wide range of material, they develop very few skills for examining the nature of ideas that they take away from their reading." While "most of the students assessed are able to answer multiple-choice questions requiring either literal or inferential skills, . . . what the majority seem to lack is experience in undertaking such explanatory tasks and the problem-solving strategies and critical-thinking skills that would develop through such experience."[1]

Less than a decade later, the National Governors' Association produced Time for Results: The Governors' 1991 Report on Education. Joe Nathan, the report's coordinator, summarizes a key position advanced in the 1986 document: ". . . students need much more than basic skills; they must also become thoughtful, responsible problem-solvers."[2]

Evidence suggests that instruction in thinking skills is neither widespread nor successful. After reviewing research on critical thinking, Stephen Norris concluded, "Critical thinking ability is not widespread. Most students do not score well on tests that measure ability to recognize assumptions, evaluate arguments, and appraise inferences."[3] David Perkins,

co-director of Harvard Project Zero at Harvard University's Graduate School of Education, concurs: "I have found that conventional education at the high school, college, and graduate school level has hardly any effect on the development of general reasoning abilities."[4] A reason advanced by the National Association of Secondary Principals in How Fares the Ninth Grade is that there are simply too few instructional activities designed to promote active thinking.[5]

Marlene F. LaCounte suggests two reasons "for the relegation of the teaching of thinking to low priority:" "the abstract nature of thinking and the confusing array of proposed approaches to teaching thinking."[6]

Robert Sternberg and Kastoor Bhana analyzed research on the effectiveness of intellectual skills programs. While they assessed some thinking skills training programs as "probably not a whole lot better than snake oil," they, nevertheless, remained "confident about the possibility for thinking skills instruction." Sternberg and Bhana argue:

> The opportunities exist to increase students' thinking skills, and the time to seize them is now. What is needed to make such instruction succeed is cautious planning, a sound program, effective implementation, strong commitment, and diligent evaluation. When these ingredients are present, instruction in thinking skills is both possible and feasible.[7]

Designing an instructional strategy to enhance the development

of thinking skills requires, first, classifying the skills to be taught and, second, determining an appropriate, instructional framework. This paper draws from current research and thought to provide such an overview.

Two notations are in order regarding this paper's research base. When conducting an ERIC computer search, Richard Paul "identified 1,894 articles written about critical thinking in the last seven years."[8] Research for this paper has not been exhaustive; information cited comes from a limited number of sources available. When possible, the author has included sources which synthesize research on thinking skills. Second, while articles in speech communication journals have contributed to thinking instruction,[9] this literature is not included here. This paper is designed to serve as an addition to, rather than a summary of, communication literature.

CLASSIFYING THINKING SKILLS

Jacob Bronowski argues that thinking requires a "constant adventure of taking the closed system and pushing its frontiers imaginatively into the open spaces where we shall make mistakes."[10] Marlene LaCounte contends that "thinking may be defined as 'abstract mental manipulation.' That is, thinking is not reading, writing, speaking, acting, listening, sensing, etc., which are concrete or physical acts. Thinking processes enable the acts."[11]

While the product of thinking may be concrete, the process of thinking is necessarily abstract. Bronowski's and LaCounte's

definitions may be accurate, but they do not provide meaningful direction for structuring thinking instruction. Other writers have opted for greater specificity. Edward de Bono, director of the Cognitive Research Trust in Cambridge, England, suggests that thinking can be reactive, i.e., critical thinking, or proactive. The latter, he argues, is "generative, constructive, and organizing."[12] Others divide thinking into a "convergence-divergence" continuum.[13] Again, while these concepts may be helpful to our understanding of the process of thinking, they are not concrete enough to answer the question, "What thinking skills or skill clusters should be taught in the educational curriculum?"

The most widely accepted subset of thinking skills is that identified by Benjamin S. Bloom and his associates.[14] Published in 1956, this classification of educational objectives has become known as "Bloom's Taxonomy." The hierarchy includes six thinking skills: knowledge, comprehension, application, analysis, synthesis, and evaluation. Skills of analysis, synthesis, and evaluation are often classified as "higher-order" skills and considered essential for critical thinking.[15]

Perhaps the most practical approach to classifying thinking skills is that provided by Kenneth R. Chuska. Dr. Chuska has discovered twenty-seven "ways of thinking most commonly identified in the literature about thinking development today:"

Comparing	Estimating
Classifying	Summarizing

Hypothesizing	Justifying
Synthesizing	Making assumptions
Sequencing	Using analogies
Predicting	Imagining
Evaluating	Logical deducing
Translating	Identifying pros/cons
Reorganizing	Identifying propaganda
Prioritizing	Identifying consequences
Setting criteria	Observing
Goal setting	Creating/designing
Problem solving	Interpreting[16]
Decision making	

Chuska then condenses the above list into five more manageable categories:

1. Creative or Inventive. Practice in this type of thinking enables students to generate or produce unique or original ideas, processes, and products. Synthesis is a major method in this category.
2. Logical. Practice in this type of thinking enables students to follow sequential steps in thinking, to justify if-then relationships, and to use deductive reasoning in solving a problem.
3. Experimental or Investigative. Practice in this type of thinking enables students to test hypotheses, to use survey methods to learn about issues and opinions, and to learn about the use of control

of variables in scientific investigations.

4. Analytical or Critical. Practice in this type of thinking enables students to engage in whole-to-part and part-to-whole thinking, to practice inquiry methods used in the social studies and science, and to be more discriminating in making decisions.
5. Reflective. Practice in this type of thinking enables students to discipline themselves to delay decision making until sufficient data is at hand or alternatives are explored.[17]

The first step in designing an instructional strategy to enhance the development of thinking skills is to determine what should be taught. The Chuska lists encompass a broad spectrum of skills which are then focused into five skill clusters.

SELECTING AN INSTRUCTIONAL FRAMEWORK

Teaching thinking skills may take two forms: the pervasive approach or the subject approach. Bruce Joyce, drawing in part from research by Carl Bereiter, advocates the pervasive model. He argues that "it is possible to pervade the curriculum with intellectual process so that the teaching of thinking is an important component of every school activity."[18] This approach assumes that instruction in content and intellectual process is mutually reinforcing. Thinking skills are not taught in isolation but are applied to a variety of contexts.

Teaching thinking skills as a distinct subject is not as prevalent in the United States as in some other countries. The governments of Venezuela and Bulgaria, for example, have adopted the CoRT Thinking Program, a program developed by Edward de Bono to teach thinking as a subject area. Thirty percent of Great Britain's schools now use CoRT.[19]

De Bono acknowledges that his approach "in practical terms . . . is sometimes inconvenient. It may also seem to remove thinking from being everyone's business to being the concern of of those who teach 'thinking.'" He, nevertheless, argues the advantages of the subject approach:

1. If thinking is simply part of other lessons, then it never gets enough focused attention. Everyone will claim to teach his or her subject in a "thinking manner" but few will really take the time "away" from the content material.
2. Thinking will be bound too closely to subject matter. There will be no development of general meta-cognitive skills which students can then transfer to other areas.
3. The existence of a special subject area allows pupils, teachers, and parents to concentrate on acquiring a specific skill. It allows the pupil to develop a stronger self-image as a "thinker."
4. It often happens that pupils who are rather backward at other subjects suddenly shine as thinkers.

We can only recognize this phenomenon if we teach thinking in its own right.

5. Specific subject areas do not give a wide enough scope for the practice of many higher level thinking skills. Thinking will be limited to the handling of information and certain critical skills, rather than the problem-solving or generative skills.
6. The lack of subject status always inhibits the development of the subject.[20]

The CoRT Program divides thinking instruction into six areas, each of which contains ten lessons. It is but one of several programs designed to teach thinking as a subject.

Regardless of which teaching framework is selected, literature abounds with suggested strategies to promote thinking. John Barrel summarizes Susan Barnes' "Synthesis of Selected Research on Teaching Findings," listing ways in which teachers can "promote learning of basic skills and higher-level mental processes." The effective teacher:

1. Varies question levels.
2. Probes, rephrases, prompts.
3. Waits for some response.
4. Provides answer to question.
5. Asks process questions. ("How did you get that answer?")
6. Stresses students' understanding of meaning.[21]

Selma Wassermann highlights the importance of questioning

as a thinking inducing strategy. Teacher responses that encourage thinking include:

> asking the student to generate hypotheses, asking the student to interpret data, asking the student to make judgments and to specify criteria for those judgments, asking the student to apply principles to new situations, asking the student to make predictions, and asking the student to formulate ways to test predictions or hypotheses.

Wassermann adds that "challenging questions should be used thoughtfully and sparingly since overusing them may actually inhibit students' thinking."[22]

A specific type of question that seems "to be seldom used in classrooms, perhaps because we are so 'right answer' oriented," is the process question.[23] An example of a process questions is, "How did you get that answer?" As students develop their metacognitive abilities, they "take charge" of their thinking. This instructional approach seems particularly appropriate for the gifted student.[24]

A strategy for stimulating metacognition is modeling. Curtis Miles, director of the Center for Reasoning Studies at Piedmont Technical College, believes that "overtly walking through the uncertain process of thinking something through is perhaps unique in its potential for striking at the core of student thinking behavior." He reasons:

> If students are to change their behavior, (in this case,

> their approach to thinking), they must see an alternative behavior and also must believe that it is useful and attainable. Many developmental students have no alternative model to their frequently inactive way of thinking; they cannot routinely find one in their family, their friends, or their fellow students, who often think in the same inactive way. It thus becomes critically important that we find ways to model our thinking processes to students and to help them exchange models with students who think more actively and flexibly.[25]

As the National Governors' Association report illustrates, there is an increased recognition of the importance of teaching thinking skills. In order to provide this instruction, educators must determine what skills should be taught and the most appropriate framework for this teaching. Although all teachers can work individually to stimulate thinking in their students, the challenge requires a collective and an institutional commitment. The importance of this commitment is highlighted in the conclusion of the National Assessment of Educational Progress report:

> In a world overloaded with information, both a business and a personal advantage will go to those individuals who can sort the wheat from the chaff, the important information from the trivial. Skills in reducing data, interpreting it, packaging it

> effectively, documenting decisions, explaining complex matters in simple terms and persuading are already highly prized in business, education and the military and will become more so as the information explosion continues. They will also be increasingly important at personal and social levels. Quality of life is directly tied to our ability to think clearly amid the noise of modern life, to sift through all that competes for our attention until we find what we value, what will make our lives worth living.[26]

Stephen Norris is more succinct. Critical thinking, he argues, "is not an educational option. Students have a moral right to be taught how to think critically."[27]

NOTES

[1] National Assessment of Educational Progress, Reading, Thinking and Writing: Results From the 1979-80 National Assessment of Reading and Literature, Report No. 11-L-01 (Denver: Education Commission of the States, October 1981), 2.

[2] Joe Nathan, "Implications for Educators of Time for Results," Phi Delta Kappan 68 (1986): 198.

[3] Stephen P. Norris, "Synthesis of Research on Critical Thinking," Educational Leadership 42.8 (1985): 44.

[4] David N. Perkins, "Thinking Frames," Educational Leadership 43.8 (1986): 6.

[5] David B. Strahan, "Guided Thinking: A Research-Based Approach to Effective Middle Grades Instruction," Clearing House 60 (1986): 149.

[6] Marlene F. LaCounte, "Teaching Thinking: Snake Oil, Medicine Shows, and Nostrums," Clearing House 60 (1987): 250.

[7] Robert J. Sternberg and Kastoor Bhana, "Synthesis of Research on the Effectiveness of Intellectual Skills Programs: Snake-Oil Remedies or Miracle Cures?" Educational Leadership 44.2 (1986): 67.

[8] Richard W. Paul, "Critical Thinking Research: A Response to Stephen Norris," Educational Leadership 42.8 (1985): 46.

[9] Articles in speech communication journals which address the teaching of critical thinking are several: Barnlund,

Dean C. "The Reflective Mind in the Making." Speech Teacher 1 (1952): 86-94. Brembeck, Winston L. "The Effects of a Course in Argumentation on Critical Thinking." Speech Monographs 16 (1949): 177-189. Frank, Allan D. "Teaching High School Speech to Improve Critical-Thinking Ability." Speech Teacher 18 (1969): 297-302. Gibson, James W., and Robert J. Kibler. "Creative Thinking in the Speech Classroom: A Bibliography of Related Research." Speech Teacher 14 (1965): 30-34. Gunderson, Robert G. "Teaching Critical Thinking." Speech Teacher 10 (1961): 100-104. Hample, Dale. "Teaching the Cognitive Context of Argument." Communication Education 34 (1985): 196-204. Howell, William Smiley. "The Effects of High School Debating on Critical Thinking." Speech Monographs 10 (1943): 96-103. Huseman, Richard, Glenn Ware, and Charles Gruner. "Critical Thinking, Reflective Thinking, and the Ability to Organize Ideas: A Multivariate Approach." Journal of the American Forensic Association 9 (1972): 261-265. Katula, Richard A., and Celest A. Martin. "Teaching Critical Thinking in the Speech Communication Classroom." Communication Education 33 (1984): 160-167. Tucker, Raymond K. "Discussion Outlines and Skill in Reflective Thinking." Speech Teacher 6 (1957): 139-142.

[10] John Barrell, "'You Ask the Wrong Questions!'" Educational Leadership 42.8 (1985): 22.

[11] LaCounte 250.

[12] Edward de Bono, "Beyond Critical Thinking," Curriculum

Review 25.3 (1986): 16.

[13] Lloyd Earl Duck, "Seven Cardinal Principles for Teaching Higher-Order Thinking," Social Studies 76 (1985): 129-133.

[14] B. S. Bloom, et al, Taxonomy of Educational Objectives: The Classification of Educational Goals, Handbook I, Cognitive Domain (New York: McKay, 1956). See also: Richard W. Paul, "Bloom's Taxonomy and Critical Thinking Instruction," Educational Leadership 42.8 (1985): 36-39. Mark A. Schlesinger, "The Road to Teaching Thinking: A Rest Stop," Journal of General Education 36 (1984): 182-196.

[15] Paul, "Bloom's Taxonomy" 36.

[16] Kenneth R. Chuska, "Teaching the Process of Thinking, K-12," Phi Delta Kappa Fastback 244 (1986): 11.

[17] Chuska 19.

[18] Bruce Joyce, "Models for Teaching Thinking," Educational Leadership 42.8 (1985): 5.

[19] de Bono 15.

[20] de Bono 16.

[21] Barrell 22.

[22] Selma Wasserman, "Teaching for Thinking: Louis E. Raths Revisited," 68 (1987): 464.

[23] Barrell 22.

[24] M. Ann Dirkes, "Metacognition: Students in Charge of ff Their Thinking," Roeper Review 8 (1985): 96.

[25] Curtis Miles, "The Fourth R: Modeling the Thinking Process," Journal of Developmental Education 9.3 (1986): 26.

[26] National Assessment of Educational Progress 5.

[27] Norris 44.